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FACTSHEET

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Background

Creep feeding is the practice of providing nursing calves with the opportunity to eat feed to which the cows do not have access. Creep feed can be in many forms, including dry hay, silage, or pasture, but is most commonly in the form of a grain mix. The most common objective of creep feeding is to increase the growth rate of nursing calves. Other benefits include producing a more uniform calf crop, reducing weaning stress on calves, and allowing young and/or thin cows to enter the post nursing period in better condition. Creep feeding will also reduce the feed requirements of the cow herd while maintaining or improving the performance of the nursing calves.

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Calf Nutrition

Most beef cows on an adequate plane of nutrition will produce enough milk during the first 90 days of lactation to satisfy the nutritional requirements of the growing calf. After this time, milk production may not be sufficient to meet the calf's increased nutrient requirements for rapid growth. If rapid growth is to be maintained, additional nutrients must be consumed by the calf.

On a conventionally managed pasture, milk production of cows calving in the spring usually peaks, then declines as pasture quality and availability declines through the pasture season. In this situation calves are not able to consume enough milk and quality pasture to meet their need for rapid growth. If calves are fall born, they will not have access to pasture. Winter feed supplies for lactating beef cows may be of medium quality and not very palatable nor nutritious for young calves. Milk production of cows over winter may be limited by the quantity and quality of their diet. In both of these situations calf growth can be maintained by supplying additional nutrients in the form of creep feed.

Conversion of Creep Feed to Gain

A. Free Choice Conventional Grain Creeps

A large amount of research has been done to compare the growth rates of calves offered creep feed free choice with those of non-creep fed calves. The conventional creep ration has been a grain mix with a crude protein content of 14-16% (Dry matter basis). Researchers have reported average weaning weight increases of 15 to 80 lbs per creep fed calf. These differences are related to the quantity and quality of other feeds available to the calf (pasture, milk, cow ration). The results have also shown large differences in the conversion ratio of creep feed to additional gain (weight gain over that shown by non creep fed calves). Feed conversion (lbs. creep feed:lbs. additional calf gain) may range from 5:1 for calves on poor pasture to 17:1 for calves on excellent pasture (Table 1). In these trials creep consumption is measured, but pasture and milk consumption by calves are not. The resulting calculated feed conversion is not a true measure of biological conversion, but rather an "observed" measure of conversion of creep to additional calf gain. The observed feed conversion is, however, an important economic factor in determining the profitability of creep feeding.

Table 1: Conversion of Free-Choice Creep Feed To Additional Calf Gain
[Grain Mix, 14-16% CP (DM), 70% TDN (DM)]

Situation	Pounds Feed (As Fed) : Pounds Extra Gain
1. Pasture quality excellent, cow milk production above average.	14 - 17:1
2. Pasture quality average, cow milk production average.	8 - 10:1
3. Pasture quality poor, cow milk production below average, or fall born calves.	4.5 - 6:1

It appears that when pasture quality is good and cows are milking well, the calves substitute creep feed for available milk and pasture. This results in a small increase in rate of gain and relatively poor feed conversion (situation 1, Table 1). With poor pasture and low milk production by cows, creep feed is efficiently converted to additional gain (situation 3, Table 1). In this situation, the efficient observed conversion and larger increase in rate of gain indicates that the creep feed is supplying additional nutrients which would not otherwise be available. This situation would be typical of many Ontario pastures during late summer and fall. In most average pasture situations it is expected that spring born calves will convert a free choice grain creep feed to additional gain at a rate of 8-10 lbs. of feed per 1 lb calf gain.

*(All nutrient values are given on a dry matter (DM) basis unless otherwise stated.)

Table 2 shows the expected consumption of a standard grain mix offered free choice on an average quality pasture. Consumption of creep feed is influenced by several factors. As the quantity and quality of other available feeds (pasture, cow ration) increases, creep feed consumption will decrease. Creep feed consumption will be lower if the milk production level of cows is high. Consumption of creep feed will increase as palatability of the creep ration increases.

Table 2: Consumption of Free-Choice Conventional Creep Feed by Calves on Average Pasture

Age of Calf (Months)	Creep Feed Consumed	
	lbs/day	lbs/month
1-2	0.5	15
2-3	1.5	45
3-4	2.5	75
4-5	3.5	105
5-6	5.0	150
6-7	7.0	210

B. Limit Fed High Protein Creep Rations

Recent studies have shown that a limit fed high protein (18% + CP) creep feed can be efficiently converted to additional gain by calves. Table 3 shows the results of an Oklahoma study which compared calf growth on a high protein (40% CP) salt limited creep ration, a free-choice grain creep and no creep feed. Over a period of approximately 4 ½ months the conversion of high protein creep feed to extra gain averaged 3.3:1, compared with 7.8:1 for the free-choice situation.

Table 3: Effect of Salt Limited Protein Creep Feed on Calf Performance (Oklahoma)*
* Lusby (1986)

Item	No Creep	Salt-Limited** protein creep	Free-choice grain creep
Gain over controls (lbs)	--	+ 30	+ 79
ADG (133d) (lbs)	1.73	1.95	2.32
Creep/calf/day (lbs)	--	0.74	4.61
Lbs. creep/lb gain	--	3.3	7.8
Est. Creep Feed cost/calf (133 days) (\$)		9.75	30.70

** 90% cottonseed meal, 10% salt

Kansas researchers have experimented with a high protein (18% CP) creep ration which contains salt and Rumensin to limit intake (Table 6, Part 3a). This ration was fed during the last 6 weeks prior to weaning. Calves offered this creep ration gained 0.25 lbs/day more than control calves (no creep) over the 6-week period. Observed feed conversion of creep feed to additional calf gain was 4.4:1.

Although limited feeding (1-2 lbs/day) of a high protein creep ration will not usually increase calf gains as much as unlimited creep feed, it may be more economical. The better feed conversion (2.5:1 to 4.5:1) obtained with limited feeding may produce a higher return, after feed costs are deducted, than unlimited creep feeding. As well, limit feeding should minimize potential problems such as digestive upsets and fattening of medium frame calves.

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Economics of Creep Feeding

The profitability of creep feeding is directly related to:

1. cost of the creep ration
2. price received for calves
3. conversion rate of creep feed to additional gain

Table 4 shows projected returns less creep feed costs for calves on average pasture over three levels of creep feed cost, compared with non-creep fed calves. This table suggests that in this situation returns to a conventional free-choice creep feeding program may be marginal or negative over the range of prices used.

Table 4: Returns Less Creep Feed Costs For Average Pasture And Milk Production

	No Creep	Free-Choice		Creep*
Feed cost (¢ / lb)	--	6	8	10
Weight of calf (lbs)	550	600	600	600
Selling Price (¢ / lb)**	90	89	89	89
Returns / hd (\$)	495	534	534	534
Creep consumed / hd (lbs)	--	500	500	500
Cost of Creep / hd (\$)		30	40	50
Returns less cost of creep feed (\$)	495	504	494	484

* Assumes conversion ratio (lbs creep: lbs. additional calf weight of 10:1)

** Assumes a discount of 2¢/lb on sale price for each additional 100 lbs of increased calf sale weight.

Table 5 shows projected returns less feed costs for calves on poor pasture. These figures indicate that a conventional creep feeding program is more likely to show a positive return when pasture quality is poor and milk production of cows is low. The more positive returns result from a better conversion of creep feed to extra gain.

Table 5: Returns Less Creep Feed Costs For Poor Pasture And Milk Production

	No Creep	Free-Choice		Creep*
Feed Cost (¢ / lb)	--	6	8	10
Weight of calf (lbs)	450	500	500	500
Selling Price (¢ / lb)**	92	91	91	91
Returns per head (\$)	414	455	455	455
Creep Feed consumed / head (lbs)	--	300	300	300
Cost of Creep per head (\$)	--	18	24	30
Return less creep cost (\$)	414	437	431	425

* Assumes conversion ratio (lbs creep:lbs extra calf weight) of 6:1

** See Table 4

Feed costs and calf prices vary from farm to farm and fluctuate over time. The calculations in Tables 4 and 5 can easily be reworked with figures specific to your operation. As described in the previous section, the conversion rates obtained with limit fed, high protein rations may be significantly lower than conventional free-choice rations.

The weight related price discount used in Tables 4 & 5 is equivalent to 2¢/lb for each 100 lb. increase in calf sale weight. This type of discount has been common for calves between 400-800 lbs. at local sales and in national price summaries. With small frame stocker calves, some extra discount may be experienced if calves show excessive body condition (fat cover). These calves may be less efficient if put into a backgrounding program. Overconditioning of small frame replacement heifer calves may impair their future milking ability. Overconditioning can be avoided by ensuring that the creep ration energy content is moderate and the protein level of the creep ration is sufficient to balance its energy content, or by limit feeding the ration.

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Creep Feeding as Part of an Effective Weaning Program

Creep feeding calves for the last 3-4 weeks prior to weaning will help to minimize the stress which affects calves at weaning by getting the calves used to eating dry/stored feeds. Minimizing stress will reduce disease problems occurring at weaning, reduce treatment costs and enhance cattle performance postweaning. For more information on effective weaning management see OMAF Factsheet Preconditioning of Beef Calves, Agdex 421/10.

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Creep Rations

Grain Mixes

The optimum energy and protein content of a creep ration is related to many factors. These include:

1. type of feeding system - free choice or limit fed
2. weight of calves - lighter calves require a higher protein level

3. frame size of calves - small frame calves tend to become overconditioned on high energy rations
4. quality and quantity of other available feeds such as pasture or winter cow ration

If rations are formulated without intake limiters and offered free choice, energy content should be in the 65-75% TDN (DM) range. Rations for light calves (less than 400 lbs) should contain about 16% CP (DM). For heavier calves (greater than 400 lbs), the protein content may be reduced to 14% (DM).

Rations with higher levels of CP and TDN may be used if the amount of creep feed consumed per head per day is controlled. Creep feed consumption may be limited by hand feeding daily or by the addition of intake limiters such as salt to the ration.

Table 6 contains creep rations for various situations. Example #3b of Table 6 "Bypass Protein Creep Ration" is a complex, high protein, high energy ration that contains a balance of rumen soluble protein and rumen escape protein. Rations such as this which contain added salt to limit intake increase the fluid demand of calves. Cows must be milking well or water must be in abundant supply for these rations to be effective.

Pasture As Creep Feed

Some interest is being shown in using pasture as a source of calf creep feed. If cows and calves are in a rotational grazing system, calves may be allowed early access to the next paddock in the rotation. Calves are very selective grazers and will consume the most palatable and nutritious forage available when not forced to compete with cows.

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Creep Feeders

Creep feeders for grain mixes may be purchased from commercial sources or built on the farm. Many variations in design are possible. The feeder must allow calves access to the creep ration while preventing access by cows. Owner built feeders should be designed with availability of materials and cost in mind. If calves will be creep fed on pasture, feeder portability is an asset, especially if a rotational grazing system is utilized. If one pasture or a central watering area is utilized, a conventional feeder located in a fenced off portion of the central area, which allows only calves access will serve as a simple creep feeder. For fall born calves and other situations where cattle are close to the barn, it may be possible to restrict access to a certain area of a barn or yard to calves only. This can be done by reducing the width and/or height of the access gate or door to keep cows out but allow calves to pass through. A simple feed bunk or conventional self feeder is used in the restricted area.

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Summary

Creep feeding is a procedure which can be used to maintain or increase the growth rate of nursing calves. Creep feeding will be more effective when the calves' supply of other feeds (milk, pasture, cow ration) is limited in quantity or quality. The profitability of creep feeding is dependent on the cost of the creep ration, price received for calves and the conversion of creep to additional gain.

CP = Crude Protein

TDN = Total Digestible Nutrients (Energy)

Ration CP & TDN given on a dry matter basis

Table 6: Example Creep Rations

1. For Free-Choice Consumption	
Ingredient	% of ration (as fed basis)
(a) Rolled Oats	84

32% Protein Supplement	16
CP 16% TDN 65%	
(b) Rolled Oats	42
Rolled Barley	42
32% Protein Supplement	16
CP 16% TDN 68%	
(c) Rolled Oats	92
32% Protein Supplement	8
CP 14% TDN 73%	
2. To be Limit Fed - Maximum 3 lbs/hd/day	
Ingredient	% of ration (as fed basis)
(a) Rolled Barley	50
Rolled Oats	50
CP 12.5% TDN 78.5%	
(b) Rolled Oats	57
Cracked Corn	40
32% protein supplement	3
CP 12% TDN 80%	
3. High Protein Rations Containing Limiters	
(a) Kansas Creep Ration* (Ref. Brazle)	
Ingredient	% of ration (as fed basis)
Corn Grain	72.5
48% Soymeal	20.0
Cal-phos	2.5
Salt	5.0
Rumensin added by prescription at the rate of 50 mg/lb	
CP 20% TDN 76%	
* If intake exceeds 2 lbs/hd/day increase salt to 8-10%	
(b) Bypass Protein Creep Ration*	
Ingredient	% of ration (as fed basis)
Corn Grain	18
Oats	20
Barley	20
48% Soymeal	16
Dry Corn Distillers Grains	15
Molasses	5
Dicalcium phosphate	2
Ground Limestone	2
Salt	2
CP 20% TDN 76%	
* If intake exceeds 3 lbs/hd/day increase salt or limit feed by hand.	
(c) Oklahoma Study Creep Ration (Ref. Lusby)	
Ingredient	% of ration (as fed basis)
Cottonseed meal	90
Salt	10
CP 40% TDN 58%	

Management Hints

1. When starting calves on a creep ration keep feed fresh feed to appetite and clean up any leftover feed each day
2. Molasses and/or bran mixed with feed will encourage consumption.
3. Grain should be rolled or coarsely ground to prevent fines and dust.
4. Locate feeder near a sheltered or shady spot where herd tends to congregate
5. Allow - 4-5 inches of bunk space per calf in creep feeder when self feeding - 8-12 inches of bunk space when hand feeding.

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